

REMARKS

Claims 1-26 were pending in this application.

Claims 1-26 have been rejected.

Claims 1, 6, 8, 11, 16, 18, and 20 have been amended as shown above.

Claims 1-26 remain pending in this application.

Reconsideration and full allowance of Claims 1-26 are respectfully requested.

I. OBJECTIONS TO DRAWINGS

The Office Action objects to various informalities in the drawings. In particular, the Office Action notes that Figures 3B and 4B contain reference numerals not used in the specification. The Office Action also notes that Figures 3B and 4B lack reference numerals used in the specification.

The Applicants have amended the drawings to correct the noted informalities. Accordingly, the Applicants respectfully request withdrawal of the objections to the drawings.

II. OBJECTIONS TO SPECIFICATION

The Office Action objects to various informalities in the specification. In particular, the Office Action objects to the Abstract as being too long. The Office Action also objects to inconsistencies between the specification and the drawings.

The Applicants have shortened the Abstract to 150 words or less. The Applicants have also amended the drawings to make the drawings consistent with the specification. Accordingly,

the Applicants respectfully request withdrawal of the objections to the specification.

III. OBJECTIONS TO CLAIMS

The Office Action objects to various informalities in the claims. In particular, the Office Action asserts that the phrase “the at least one resource” in Claim 1 is confusing. The Applicants have amended Claims 1 and 11 to recite “at least one virtual queue” that is associated with “at least one of the resources” and that identifies one or more items to be processed by “the at least one of the resources.” The recitation of “the at least one of the resources” in Claims 1 and 11 has proper antecedent basis in the prior recitation of “at least one of the resources.”

The Office Action also asserts that the phrase “the one or more items identified” in Claim 12 is unclear. The Applicants respectfully note that Claims 1 and 11 recite “at least one virtual queue” that identifies “one or more items to be processed.” Claims 2 and 12 recite “the one or more items identified in the virtual queue.” The recitation of “the one or more items” in Claims 2 and 12 clearly has proper antecedent basis in the prior recitation of “one or more items” in Claims 1 and 11.

Accordingly, the Applicants respectfully request withdrawal of the objections to the claims.

IV. REJECTION UNDER 35 U.S.C. § 112

The Office Action rejects Claims 1-19 under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter regarded as the invention.

In particular, the Office Action identifies various informalities in Claims 1, 6, 8, 11, 16, and 18.

The Applicants have amended Claims 1, 6, 8, 11, 16, and 18 to correct the noted informalities. Accordingly, the Applicants respectfully request withdrawal of the § 112 rejection.

V. REJECTION UNDER 35 U.S.C. § 101

The Office Action rejects Claims 11-19 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In particular, the Office Action asserts that the “method as recited is not technologically embodied” because the “method can be performed simply by a person.” (*Office Action, Page 6, Last paragraph*). The Applicants respectfully traverse this rejection.

Whoever “invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore.” (35 U.S.C. §101). A “process” refers to any “process, art, or method.” (35 U.S.C. §100). Nothing in these statutes requires a recitation of any “technological art” or that method claims be “technological embodied” as asserted in the Office Action.

Moreover, according to the MPEP, a “claimed invention as a whole must accomplish a practical application,” meaning that the claimed invention “must produce a ‘useful, concrete and tangible result.’” (MPEP § 2106). A process that “consists solely of the manipulation of an abstract idea” is not “concrete or tangible.” (MPEP § 2106). The Patent Office has “the burden to establish a *prima facie* case that the claimed invention as a whole is directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result.” (MPEP

§ 2106). Only when a claim is “devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. 101.” (*MPEP* § 2106).

The Office Action has not alleged that the claimed invention has no “practical application in the technological arts.” As a result, the Patent Office has not met its burden of establishing that the claimed invention as a whole is devoid of any limitation to a practical application in the technological arts. Also, the plain language of the claims indicates an “application” to the technological arts. For example, Claim 11 recites generation of a “graphical user interface,” which indicates an “application” to the technological arts, unless the Patent Office takes the position that a “graphical user interface” is itself only an abstract idea.

The undersigned is aware of rumors that the Board of Patent Appeals and Interferences may shortly issue a precedential opinion addressing or changing the required examination of claims such as Claims 11-19. However, until such an opinion is issued (if it ever issues), the undersigned respectfully submits that the Patent Office is bound to follow the current law, rules, and MPEP. The current law, rules, and MPEP require a showing by the Patent Office that the “claimed invention as a whole is devoid of any limitation to a practical application in the technological arts.” The Patent Office has not made that showing here.

Accordingly, the Applicants respectfully request withdrawal of the § 101 rejection.

VI. REJECTION UNDER 35 U.S.C. § 103

The Office Action rejects Claims 1 and 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,615,092 to Bickley et al. (“*Bickley*”). The Office Action

rejects Claims 20, 21, and 23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,616,208 to Lee (“*Lee*”) in view of U.S. Patent No. 6,470,227 to Rangachari et al. (“*Rangachari*”). The Office Action rejects Claims 2, 3, 5, 6, 8-10, 12, 13, 15, 16, 18, 19, 25, and 26 under 35 U.S.C. § 103(a) as being unpatentable over *Lee* and *Rangachari* in view of *Bickley*. The Office Action rejects Claims 4, 7, 14, 17, 22, and 24 under 35 U.S.C. § 103(a) as being unpatentable over *Lee*, *Rangachari*, and *Bickley* in view of U.S. Patent No. 6,161,054 to Rosenthal et al. (“*Rosenthal*”). These rejections are respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP* § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (MPEP § 2142).

Regarding Claims 1 and 11, *Bickley* recites a method, system, and facility for controlling resource allocation in a manufacturing environment. (*Abstract*). Each area within a manufacturing facility has an associated "WIP profile." (*Col. 4, Lines 43-46*). A WIP profile identifies the current state of a production environment, such as by identifying the "volume and throughput of product" for an area or by identifying the products stored in another area of the manufacturing facility. (*Col. 4, Lines 43-46; Col. 5, Lines 10-13; Col. 8, Lines 37-40*). A control center may use this information to generate various user interfaces and perform various tasks. (*Col. 8, Line 15 – Col. 10, Line 55*). For example, the control center may determine if resources need to be re-allocated in the event of an error with equipment in the facility. (*Col. 10, Lines 20-34*). If re-allocation is needed, the control center acquires information from the WIP profiles. (*Col. 10, Lines 34-40*). The control center then simulates an allocation of "workload" from an

inoperable section of the facility to other sections of the facility. (*Col. 10, Lines 40-48*). Multiple simulations may be performed to identify an optimized re-allocation of resources. (*Col. 10, Lines 48-51*). The optimized re-allocation of resources (referred to as an “optimized model”) is then accepted or rejected by a user, and if accepted the re-allocation of resources is implemented. (*Col. 10, Lines 51-55*).

Claim 1 recites a “model” capable of “representing mathematically [a plurality of] resources and [a plurality of] tasks” and “defining relationships among related ones of the resources and the tasks.” Claim 1 also recites a “resource allocation controller” operable to “operate the model” in response to “monitored characteristics” to “allocate ones of the resources among ones of the tasks.”

Based on these recitations, the Patent Office must establish that *Bickley* discloses (1) a “model” that represents resources and tasks and that defines relationships among related resources and tasks, and (2) the same model is “operated” in response to monitored characteristics to allocate resources among tasks. The Patent Office has not made these showings.

First, the “WIP profiles” of *Bickley* fail to disclose, teach, or suggest the “model” recited in Claim 1. *Bickley* lacks any mention that the WIP profiles both (1) mathematically represent “resources” and “tasks” in the manufacturing facility of *Bickley* and (2) define “relationships” among related resources and tasks. The WIP profiles of *Bickley* simply store information about various facilities, such as the amount of product that a facility can process or the amount of product stored in a facility. While the WIP profiles may be associated with resources in a

facility, the Office Action does not establish that the WIP profiles mathematically represent both “resources” and “tasks.” The Office Action also does not establish that the WIP profiles define “relationships” among related resources and tasks.

Bickley also lacks any mention of “operating” the WIP profiles in response to monitored characteristics. Instead, *Bickley* specifically recites that the control central simply accesses and retrieves information from the WIP profiles and then aggregates the collected information. In other words, the control central simply retrieves information from the WIP profiles. The control center never “operates” the WIP profiles in response to monitored characteristics.

Second, the “optimized model” of *Bickley* fails to disclose, teach, or suggest the “model” recited in Claim 1. The optimized model in *Bickley* represents an optimized re-allocation of resources. *Bickley* performs multiple simulations to identify a specific allocation of resources, and that specific allocation of resources is used as the optimized model. In other words, the “optimized model” of *Bickley* represents a specific allocation of resources that was determined during a simulation. *Bickley* lacks any mention of using monitored characteristics to “operate” the “optimized model” or making determinations as to how to allocate resources using the “optimized model.”

Moreover, the Office Action has not established that the optimized model mathematically represents both “resources” and “tasks” and defines “relationships” among related resources and tasks. *Bickley* specifically recites that the optimized model is generated by simulating the routing of “workload” or products being manufactured to different resources. The Office Action does not explain how a model identifying the routing of products being manufactured to

resources mathematically represents both “tasks” and “resources” and defines “relationships” among related resources and tasks.

Third, the simulations performed by *Bickley* fail to disclose, teach, or suggest the “model” recited in Claim 1. *Bickley* provides little explanation as to how the simulations are performed by the control center. *Bickley* does recite that the control center takes the workload scheduled for an inoperable section of a facility and schedules the workload to other areas of the facility. As an example, *Bickley* recites that the control center may identify areas of the facility with extra capacity and simulate routing part or all of the workload to resources in those areas. The Office Action does not provide any explanation showing how this operation requires the use of a “model” as recited in Claim 1. In particular, the Office Action does not explain how identifying resources with extra capacity requires the use of a model that mathematically represents “resources” and “tasks” and that defines “relationships” among related resources and tasks. The Office Action also does not explain why this type of model must be “operated” in order for the control center of *Bickley* to repeatedly simulate the routing of workload to available resources.

As a result, the Office Action has not established that *Bickley* discloses, teaches, or suggests a “model” capable of “representing mathematically [a plurality of] resources and [a plurality of] tasks” and “defining relationships among related ones of the resources and the tasks” as recited in Claim 1. The Office Action also has not established that *Bickley* discloses, teaches, or suggests “operat[ing]” the model “in response to ... monitored characteristics” to allocate resources among tasks as recited in Claim 1. Similarly, the Office Action has not

established that *Bickley* discloses, teaches, or suggests analogous elements in Claim 11.

For these reasons, the Office Action has not established that *Bickley* discloses, teaches, or suggests the Applicants' invention as recited in Claims 1 and 11 (and their dependent claims).

Regarding Claim 20, the Office Action acknowledges that *Lee* fails to disclose numerous elements of Claim 20. (*Office Action, Page 10, Second paragraph*). The Office Action then asserts that *Rangachari* discloses these elements of Claim 20 and that it would be obvious to combine *Lee* and *Rangachari*. (*Office Action, Page 10, Last paragraph – Page 11, Last paragraph*).

Rangachari recites a method for automating the manufacturing process for microelectronics. (*Abstract*). A computer program 10 includes an equipment manager 18, which contains application objects storing information used in various automation tasks to automate equipment 40. (*Col. 6, Lines 49-61; Col. 7, Lines 25-37*). The equipment manager 18 also includes workflows 102, each of which represents a series of activities 106 such as a sequence of manufacturing processes. (*Col. 7, Lines 3-5; Col. 9, Lines 16-17*). The architecture of the computer program 10 is shown in Figure 2. (*Col. 8, Lines 56-58*). A workflow layer 100 allows a user to define workflows 102, such as by allowing a user to define a workflow 102 using a graphical tool. (*Col. 9, Lines 13-25*). The lower layers of the computer program 10 are instantiated and used by the computer program 10 when a workflow 102 is executed. (*Col. 9, Lines 28-32*). Figure 4 of *Rangachari* illustrates the creation of a workflow 102 by a user using a graphical tool 21. (*Col. 13, Lines 4-10*). The user selects various activities from an activity window 208 and drops the selected activities into boxes 208. (*Col. 13, Lines 23-25*). Process

parameters for an activity are shown in a process parameter window 210. (*Col. 13, Lines 27-28*).

First, the Office Action incorrectly asserts that Figure 2 of *Rangachari* discloses a “first portion” of a “graphical user interface” that identifies “at least two types of semiconductor wafers to be processed by at least one of one or more wet decks and one or more furnaces.” Figure 2 of *Rangachari* represents a computer architecture. Figure 2 of *Rangachari* does not represent part of a graphical user interface. While various portions of Figure 2 (such as the workflows 102) may be created by a user using a graphical tool, Figure 2 is not a graphical user interface that is generated and provided to a user.

Second, the Office Action incorrectly asserts that Figure 4 of *Rangachari* discloses a “second portion” of a “graphical user interface,” where the second portion includes “at least one virtual queue” identifying “one or more semiconductor wafer lots that have been scheduled to be processed” by “at least one vertical polysilicon furnace.” Figure 4 simply represents a graphical tool that may be used by a user to define a workflow 102. Figure 4 does not present any information to the user about “semiconductor wafer lots” that “have been scheduled to be processed” by “at least one vertical polysilicon furnace.”

The Office Action also cites column 8, lines 23-29 and column 13, lines 4-41 of *Rangachari* as allegedly disclosing these elements of Claim 20. However, column 8, lines 23-29 of *Rangachari* simply recites that workflows 102 are defined with a tool 21 and that a database contains “process data, routes and schedule” for a fabrication. Column 13, lines 4-41 of *Rangachari* recites how a user may use a tool 21 to define a workflow 102. None of this discloses, teaches, or suggests “at least one virtual queue” in a “graphical user interface”

identifying “one or more semiconductor wafer lots that have been scheduled to be processed” by “at least one vertical polysilicon furnace” as recited in Claim 20.

For these reasons, the Office Action has not established that the proposed *Lee-Rangachari* combination discloses, teaches, or suggests the Applicants’ invention as recited in Claim 20 (and its dependent claims).

Claims 2-10, Claims 12-19, and Claims 21-26 depend from Claims 1, 11, and 20, respectively. Claims 2-10, 12-19, and 21-26 are patentable due to their dependence from allowable base claims and in light of their own recitations. For example, Claims 6, 16, and 23 recite that the “first portion” of a “graphical user interface” includes a “plurality of buckets,” where each bucket identifies a “plurality of time periods” and a “number” of items or semiconductor wafers “to be processed during each of the time periods.”

The Office Action cites three portions of *Rangachari* that allegedly disclose, teach, or suggest these elements of Claims 6, 16, and 23. The first portion (element 102) of *Rangachari* refers to workflows defined by a user. (*Col. 9, Lines 13-27*). The second portion (column 10, lines 9-26) of *Rangachari* recites how a system executes commands such as a LOAD command (which appears to initiate processing of wafers). The third portion (column 13, lines 16-41) of *Rangachari* recites how a user may use a tool 21 to define a workflow 102, where the workflow 102 includes various activities related to semiconductor fabrication.

The workflows 102 of *Rangachari* do not in any way disclose, teach, or suggest defining a “plurality of buckets” in a graphical user interface, where each “bucket” identifies a “plurality of time periods” and a “number” of items or semiconductor wafers “to be processed during each

of the time periods.” Similarly, the other two portions of *Rangachari* cited in the Office Action lack any mention of a “plurality of buckets” in a graphical user interface, where each “bucket” identifies a “plurality of time periods” and a “number” of items or semiconductor wafers “to be processed during each of the time periods.” As a result, the Office Action has not established that *Rangachari* discloses, teaches, or suggests these elements of Claims 6, 16, and 23 (and their dependent claims).

Accordingly, the Applicants respectfully request withdrawal of the § 103 rejection and full allowance of Claims 1-23.

VII. CONCLUSION

The Applicants respectfully assert that all pending claims in this application are in condition for allowance and respectfully request full allowance of the claims.

SUMMARY

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@davismunck.com*.

The Commissioner is hereby authorized to charge any fees connected with this communication (including any extension of time fees) or credit any overpayment to Davis Munck Deposit Account No. 50-0208.

Respectfully submitted,

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Date: June 6, 2005



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IN THE DRAWINGS

Please amend Figure 2A-1 to add shading to the elements labeled “SMSRM 05,” “2WD 11,” “SMSRM 06,” “Wetdeck 13,” “Wetdeck 14,” and “Wetdeck 19.” Also, please amend Figure 2A-1 to add hatching to the element labeled “Wetdeck 14.”

Please amend Figure 2A-2 to add shading to the elements labeled “Furn U3,” “Furn C1,” “Furn G1,” “Furn S1,” and “2 VGATE 4.” Also, please amend Figure 2A-2 to add hatching to the elements labeled “Furn U3,” “Furn C1,” and “Furn S1.”

Please amend Figure 3B to replace reference numeral “52” with reference numeral “352”.

Please amend Figure 4B to replace reference numeral “52” with reference numeral “452”.

The Applicants have included replacement sheets incorporating these amendments to Figures 2A-1, 2A-2, 3B, and 4B.